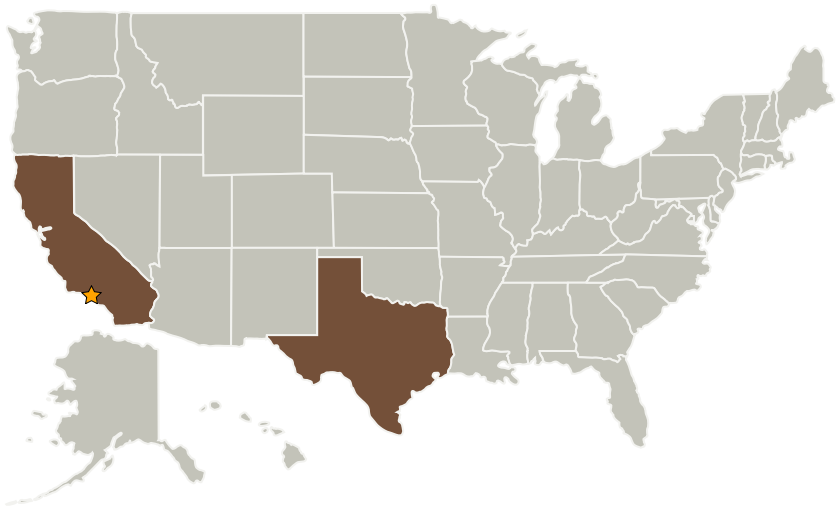
In-situ Production of Hydrogen for Buoyancy on Titan, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

Based on current observations Titan is believed to have a rich, dense atmosphere. If the findings of the Cassini and Huygens missions corroborate this, the next mission to Saturn is likely to include an autonomous vehicle capable of buoyant flight in its atmosphere. In the absence of oxygen hydrogen is the best choice of a buoyancy gas. Maintaining buoyancy for the duration of the one year mission will require a substantial supply of hydrogen to make-up for gas permeating through the gas bag. This gas can be obtained by reforming the methane, which is abundant in Titan's atmosphere. We propose to reform methane with a plasma reformer. This type of reformer converts methane to hydrogen gas and solid carbon, making separation and disposal of the carbon waste a straight forward process. It requires only methane and electrical power to operate, is tolerant of all impurities, and will reform all of the hydrogen containing materials fed in. Lynntech has already demonstrated this technology in a larger unit. This project will lead to the development of a small unit that operates on a few Watts of power. Methods for harvesting methane and separating the hydrogen and the carbon will also be developed.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Lynntech, Inc.	Supporting Organization	Industry	College Station, Texas

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Alan Cisar

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.3 Resource Processing for Production of Mission Consumables